Production Population Control: My Cattle Are Rabbits!

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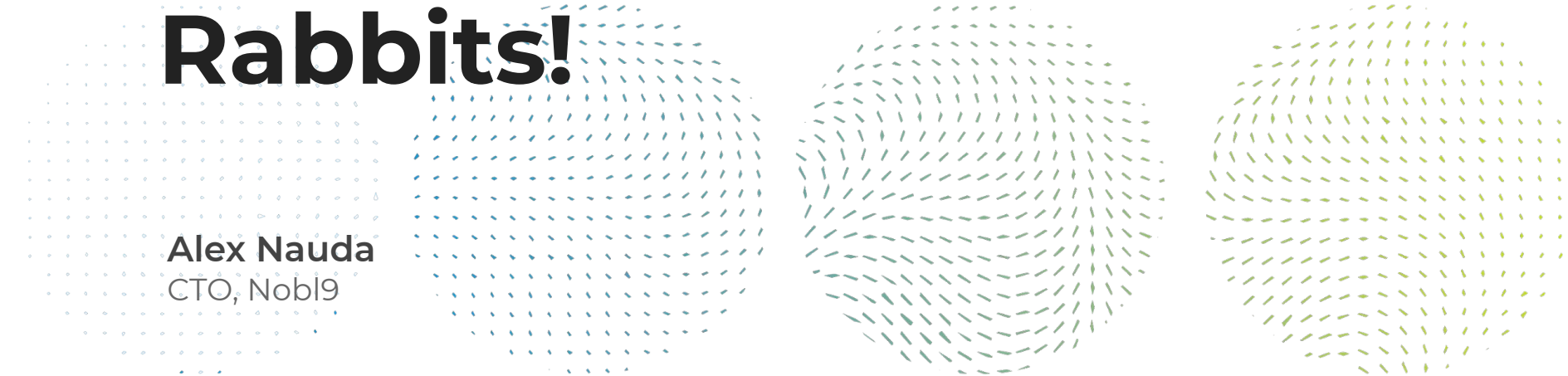


Evolution of infrastructure environments

DC / Colo

Pets

- High maintenance
- Long-lived
- Precious
- Named

Public Cloud

Cattle

- Lower maintenance
- Shorter-lived
- Disposable
- Tagged

Kubernetes

Rabbits

- Unmaintainable
- Temporary
- Pests
- Forgotten

TOO MANY

How many environments?

Per application:
- ~1 Production env
  - (max 2-3 if HA)
- 3 Test envs
  - Int, QA, Staging

Per application:
- 2-3 Production envs
  - Active/Warm/Cold
- 6-9 Test envs
  - Each team, CI, branch

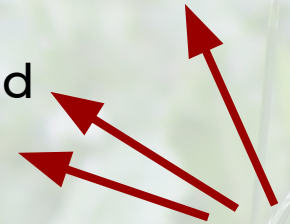
Per application:
- >10 Production envs
  - Multi-region and -cloud
- Countless Test envs
  - Dynamically stood up and torn down

MULTIPLYING

How many prod environments do we need?

Production:

- Regional HA - One for every supported region of every supported cloud
- DR - Active/active/passive/warm/cold
- Blue/Green - A blue for every green



Often no traffic

How many test environments do we need?

Test:

- Shared, hosted development environment
  - ...per team
- Individual developers' hosted environments
  - ...for at least some back end devs, but everyone wants one
- CI environment for every pull request
- QA
- Staging
- UX validation
- Sales demo
- Pen testing

} **Often no traffic**

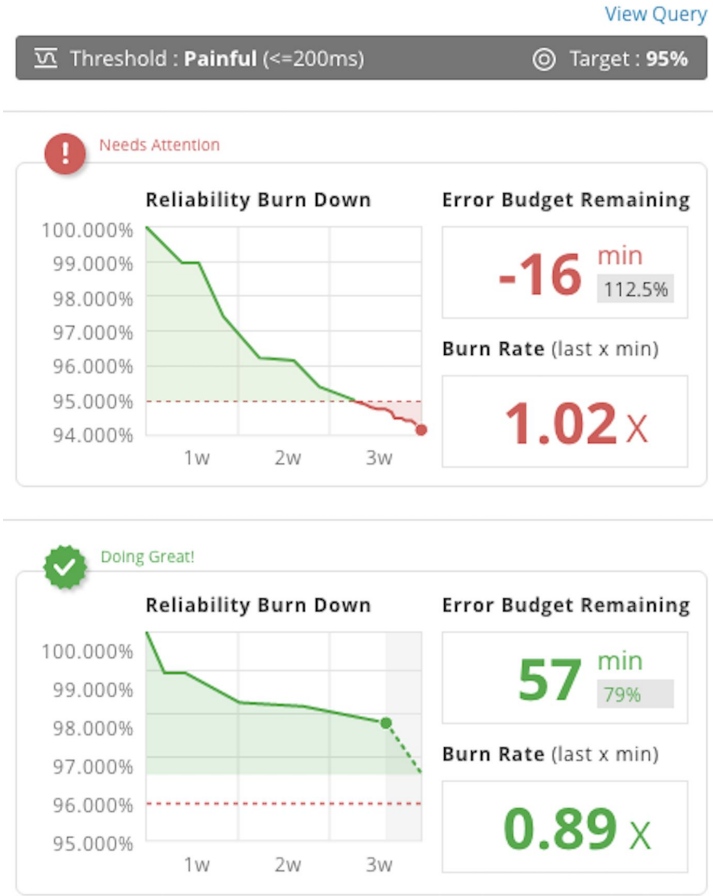
Also, who responds to alerts for these?

Problem statement

All of these environments are

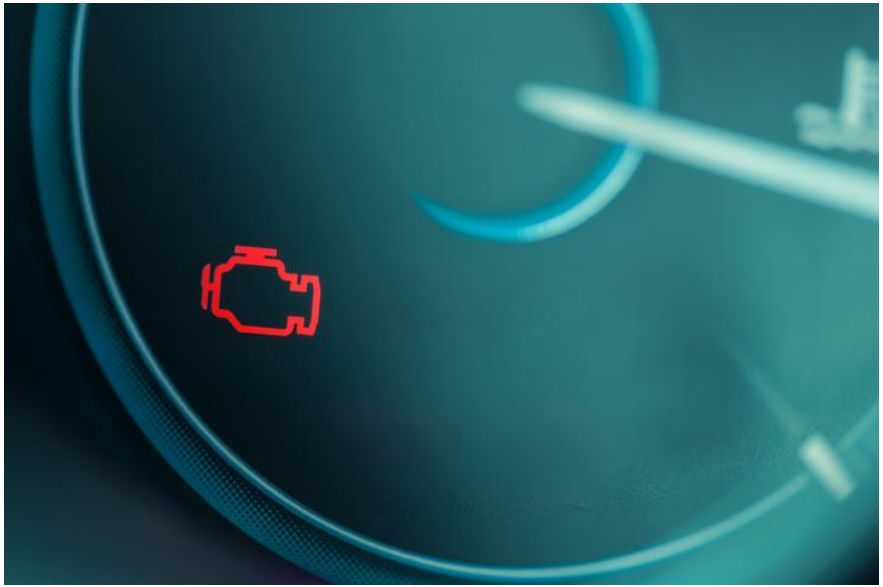
- Unmanageable
- Expensive
- Overstimulating
- Diverse
  - Variety of use cases and traffic patterns
  - Differing requirements for reliability

→ We need appropriate SLOs to monitor these environments



Properties of SLOs: 1. Low context

Not like this



Like this!

SET AND FORGET

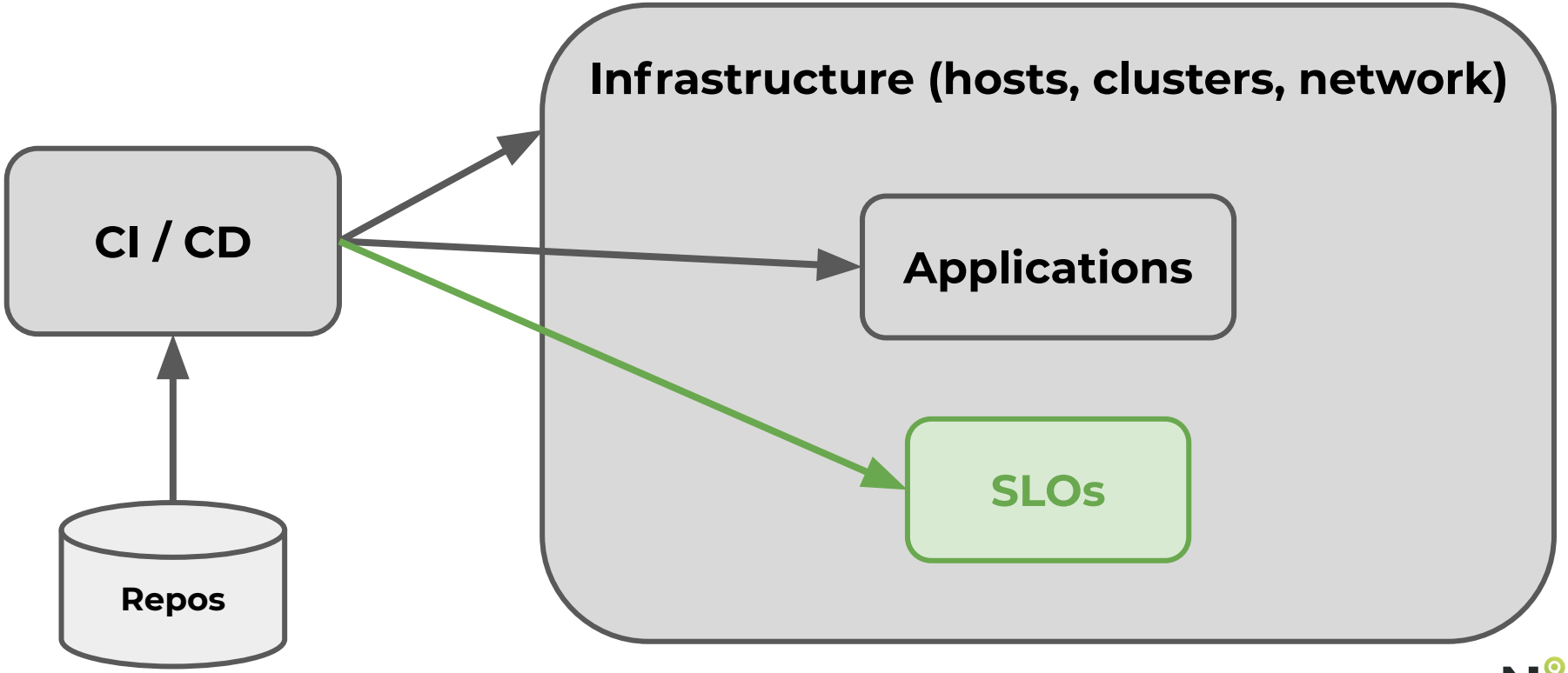
Properties of SLOs: 2. Easily tunable

Not like this

Like this!

TURN THAT DOWN (OR UP)

Must be automatable (Gitops, IaC)



What to pick for SLIs?

Traditional SLIs depend on user activity

- Key business metrics
- Tied to user satisfaction
- Who even are the users of your test envs and your DR cold site?

What can we do instead?

→ First of all, we can use an occurrences-based SLO

→ Next, we can monitor for lights-on behavior

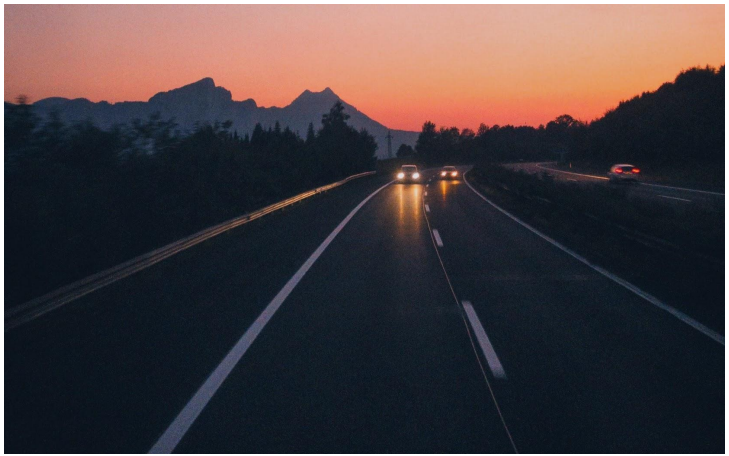
→ Finally, we can use synthetics

...and we can do that across the entire stack

Occurrences-based SLOs

(a/k/a Event-based SLOs)
Measure a straight ratio of successful events (requests, jobs, attempts)
...as opposed to time slices - good minutes vs bad minutes
This can be used with any counter type metric

→ So they automatically adjust for low traffic periods



Lights-on SLIs for infrastructure and clusters

- kube-state-metrics
  - Are my nodes on?
    - count(kube_node_status_condition{condition="Ready", status="false"}) == 0
  - Are my pods on?
    - sum(kube_deployment_status_replicas_unavailable) == 0
    - sum(kube_daemonset_status_number_unavailable) == 0

- Is my k8s not broken?
  - Kubernetes API response time (Occurrences method SLO)
  - Pod start latency (Occurrences method SLO)

Lights-on SLIs for applications

- Hosting-specific ingress or load balancing
  - e.g. AWS ALB unhealthy count == 0
- Latency of requests/events (Occurrences method SLO)
- Success of requests/events (Occurrences method SLO)

Synthetic SLIs for infrastructure and clusters

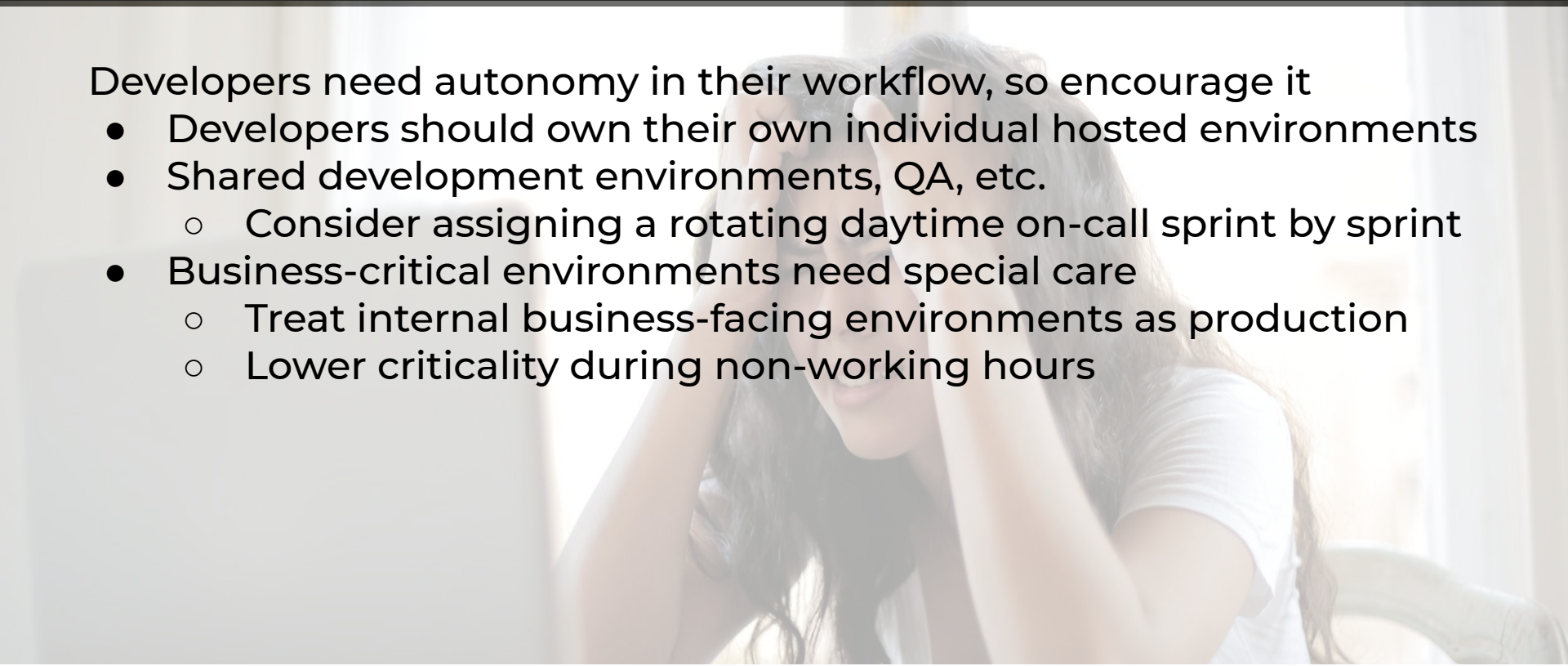
Kuberhealthy

- DNS resolution
  - avg(kuberhealthy_check{check=~"kuberhealthy/dns-status.*", status="1"}) / avg(kuberhealthy_check{check=~"kuberhealthy/dns-status.*"})
- Deployment works
  - avg(kuberhealthy_check{check="kuberhealthy/deployment", status="1"}) / avg(kuberhealthy_check{check="kuberhealthy/deployment"})
- Daemonset works
  - As above; check="kuberhealthy/daemonset"

Synthetic SLIs for applications

- Have automated functional tests
  - Popular tools in this space
    - Mabl
    - Runscope (back end)
    - Ghost Inspector (front end)
- Run them regularly in every environment
  - In production, use an isolated account or tenant
  - In test environments, run them every so often to give your SLOs something to measure to detect bad deploys
  - Example SLO:
    - Total tests succeeding / total tests run over 1 hour
    - Very strict target in production
    - Lower target for lower order environments

Define clear ownership of non-production SLOs



Developers need autonomy in their workflow, so encourage it

- Developers should own their own individual hosted environments
- Shared development environments, QA, etc.
  - Consider assigning a rotating daytime on-call sprint by sprint
- Business-critical environments need special care
  - Treat internal business-facing environments as production
  - Lower criticality during non-working hours

Rabbit control

- Prerequisite: automatable SLOs-as-code
- Create a set of simple SLOs that work in any environment
  - Set and forget (until they alert)
- Work around the issues caused by sparse traffic
  - Monitoring lights-on behaviors
  - Making the most of synthetics
- Define clear alert policies and ownership for these generated SLOs

Thank You

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